

LOGGERHEAD SHRIKE (*Lanius ludovicianus*) (Mainland Populations)

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Criteria Scores

Population Trend	Range Trend	Population Size	Range Size	Endemism	Population Concentration	Threats
15	0	5	0	0	0	15

Special Concern Priority

Currently considered a California Bird Species of Special Concern (year round), Priority 2. Not included on the original prioritized list (Remsen 1978). Included on CDFG's (1992) unprioritized list, but populations not distinguished from one another.

Breeding Bird Survey Statistics for California (Sauer et al. 2000)

1966-1999					1966-1979			1980-1999			Credibility
Trend	<i>P</i>	<i>n</i>	(95% CI)	R.A.	Trend	<i>P</i>	<i>n</i>	Trend	<i>P</i>	<i>n</i>	
-1.7	0.09	106	-3.7, 0.3	2.91	-7.4	0.00	75	0.1	0.90	91	med

Breeding Bird Survey (BBS) data for mainland populations of loggerhead shrike show a highly significant negative trend from 1966-1979, a marginally significant negative trend from 1966-1999, and no trend from 1980-1999. Thus it appears that following significant declines in the 1960s and 1970s, populations were relatively stable in recent decades. BBS biologists consider the species to be moderately well-sampled with the survey, likely due to low sample sizes, and therefore credibility of the above trends is considered medium. However, because shrikes are conspicuous

and often perch along roadsides – where the majority of BBS routes are situated – it also been suggested that they are adequately surveyed with this method (Peterjohn and Sauer 1995).

General Range and Abundance

The loggerhead shrike breeds throughout much of North America, occurring in Canada in southeastern Alberta, southern Saskatchewan, and southwestern Manitoba; throughout most of the United States except western Oregon, western Washington, northwest California, northern mid-western states, New England, and higher elevations throughout; and in Mexico to the southern tip of Baja California, northern Sinaloa, and Oaxaca, absent from the Atlantic slope in Mexico (Phillips 1986, Howell and Webb 1995, Yosef 1996). It winters throughout most of Mexico (including the northern Atlantic slope; Howell and Webb 1995), much of the United States (especially the southwest, south and southeast), and in portions of southern Canada (Sauer et al. 1996).

Loggerhead shrikes are found throughout much of California except the forested mountains, higher elevations of desert ranges, and the forested northwest (Small 1994). Loggerhead shrike subspecies delineations are currently still debated (Yosef 1996, Pruitt 2000); this account follows Yosef (1996) except where noted. Five subspecies occur in the state; however the Island and San Clemente loggerhead shrikes (*L.l. anthonyi* and *L.l. mearnsi*, respectively) are excluded from this account, which is restricted to mainland populations. *L.l. excubitorides* (includes previously classified *L.l. nevadensis* and *L.l. sonoriensis*) breed from Alberta and Saskatchewan, south through the Great Plains, Texas, northern Durango and southeastern California; this population winters in the southwest extending to Utah, Colorado, Louisiana, Sinaloa, and southern Veracruz. *L.l. gambelli* (formerly classified along with central and eastern subspecies *L.l. migrans* under *L.l. mexicanus*) breeds in south central Washington and southern Idaho south to southwestern California, west of the range of *L.l. excubitorides*. It is resident throughout California, and winters over much of the

breeding range and into Mexico (where range is uncertain). The third subspecies, *L.l. grinnelli*, is resident in southwestern California, from San Diego County south into northern Baja California.

Seasonal Status in California

Loggerhead shrikes are present year-round throughout most of its range in California, except the most northeast corner of the state. Parts of the breeding population are migratory, primarily in northern areas, with most individuals wintering south of 40°N (Yosef 1996); they are also migratory in the Mono Basin, Owens Valley and the northern Mojave Desert (Small 1994). Elsewhere populations are at least partially resident (Yosef 1996). Wintering individuals augment resident populations and also occur in areas where no shrikes breed (Grinnell and Miller 1944). Wintering range of western loggerhead shrikes is poorly understood (Woods 1994) although current stable isotope research may shed light on this (Pruitt 2000); Miller (1931 *in* Pruitt 2000) suggested that the partially migratory western subspecies winter primarily in the southwest, especially central and southern California and into Mexico. Wintering birds likely depart before late March; in Oregon, migratory breeders have returned by then (Gilligan et al. 1994, Holmes and Geupel 1998).

Historical Range and Abundance in California

L. l. gambelli bred in the Great Basin Plateau of northeastern California, south to Sierra County and west to Shasta Valley in Siskiyou County; in the Central Valley south through Fresno County; and in coastal areas from Sonoma County to Mexico. In winter they occurred throughout their breeding range (as residents south of 39°N), as well as in southern San Joaquin Valley and southeastern deserts. Described as “abundant” throughout most of Sonoma County (Grinnell and Wythe 1927).

L. l. excubitorides (classified by Grinnell and Miller [1944] as *L.l. nevadensis* and *L.l. sonoriensis*) bred in Mono and Inyo counties south through the deserts to the Mexico border, and

west into southern San Joaquin Valley, Kern County, and eastern San Diego County; and expanded in winter into coastal southwestern counties from Los Angeles County to Mexican border.

We have a poor understanding of the historic range of *L.l. grinnelli* in California; it was described by Miller (1931) only as a permanent resident of northern Baja California, and was not detailed by Grinnell and Miller (1944). In its currently placed range where it extends into California (Yosef 1996), Grinnell and Miller (1944) describe an intergradation between *L.l gambeli* and *L.l. sonoriensis* and *L. l. excurbitorides* as occurring there.

Recent Range and Abundance in California

General breeding range remains similar to what it was in recent historic times. However, regionally has been eliminated from or reduced in areas as a result of habitat conversion to development and agriculture. A significant negative statewide trend (-1.3%) has been documented for wintering birds using Christmas Bird Count data (Sauer et al. 1996).

Northern California. Loggerhead shrike numbers are “considerably reduced” today in Sonoma County (Stafford 1995) compared to historical abundance (Grinnell and Wythe 1927), a result at least in part of habitat conversion to housing developments, commercial sites and vineyards (Stafford 1995). Cade and Woods (1997) suggested that the only overall loss in breeding distribution in California has occurred north of San Francisco Bay in Marin and Sonoma counties; BBS trend data also reveals declines for this region (Sauer et al. 2001). Wintering numbers in that area have also been severely reduced since the 1970s as shown by Christmas Bird Count data (Rich Stallcup pers. comm.). They breed in the Honey Lake Basin in northeastern California at a density of 0.66 pairs/40 hectare in a shrubsteppe community dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and basin big sagebrush (*A. tridentata* ssp. *Tridentata*), and are less frequently encountered in higher elevation mountain big sagebrush (*A. t.* ssp. *vaseyana*)

(Humble et al. 2002). In this region densities are also high in black greasewood (*Sarcobates vermiculatus*) communities.

Central California. Riparian habitat in the Central Valley has been reduced by as much 95-98% (Katibah 1984) and converted to developments, vineyards, orchards, row crops and other agricultural fields. Such conversions have resulted in a diminished ability to meet the ecological requirements of loggerhead shrikes, and may have resulted in regional shrike populations declines; BBS trend data show both increases and decreases in different parts of this region (Sauer et al. 2001). These data also reveal declines in the central coastal region and on the east side of the Sierras in the Mono area (Sauer et al. 2001). Oak savannah habitat in the Coast Range foothills has also undergone considerable conversion in recent years.

Southern California. They are a “common” resident throughout the region’s open lowlands, but are absent from areas now heavily urbanized (Garrett and Dunn 1981); such urbanization is spreading in the region. BBS trend data reveal declines throughout the southern coastal areas as well as in the deserts of the southeastern portion of the state (Sauer et al. 2001). Christmas Bird Count data reveals a precipitous decline in the south coastal region (McCaskie and Garrett 2002).

Ecological Requirements

Loggerhead shrikes generally breed in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. They require tall shrubs or trees to use for hunting perches, territorial advertisement, and pair maintenance (or will use fences or power lines for perching instead); open areas of short grasses, forbs or bare ground for hunting; shrubs or trees for nest placement; and impaling sites, which can include sharp/thorny or multi-stemmed plants, or barbed-wire fences (Yosef 1996, Pruitt 2000). In California, such habitat requirements are met primarily in desert scrub, shrubsteppe, and pinyon-juniper woodlands; and to a lesser extent in riparian areas, chaparral, sparsely populated rural and suburban areas (Small 1994, LeFranc 1997), and oak

savannah. They appear to have similar habitat requirements, due to their perch-and-pounce hunting technique, during the non-breeding season (Yosef 1996).

Their diet is both variable and seasonally driven, including arthropods (especially grasshoppers, beetles and caterpillars), reptiles, amphibians, small rodents, and birds (Yosef 1996).

Threats

Continent-wide declines have been observed, although the reasons are poorly understood. They are declining across most states, provinces, and physiographic strata (Pruitt 2000, Sauer et al. 2000), and nationwide according to Christmas Bird Count (National Audubon Society 2002). In some areas seemingly appropriate habitat exists unoccupied, suggesting another limiting factor (for review see Pruitt 2000); however, this has been described for habitats or regions outside of the California and may not be relevant here. While the species is not likely threatened with extinction, local extirpations are a potential. Unfortunately, the causes of shrike declines, and threats to their populations, are poorly understood (Pruitt 2000).

Habitat loss on breeding and wintering grounds as well as along migratory routes is undoubtedly responsible for their decline in many areas, including portions of California where riparian areas have been reduced or lost to agriculture (RHJV 2000), and where development pressures have converted and continue to convert coastal scrub, chaparral, desert scrub, and oak savannah areas. Exotic grasses and forbs introduced by livestock grazing pose the greatest threat to shrubsteppe habitats and to shrike populations in the northern part of the state; the presence of cheatgrass (*Bromus tectorum*) often results in altered fire regimes and ultimately, conversion from a shrub-dominated landscape to annual grassland (Brooks and Pyke 2001). Humple and Holmes (2001) documented a 50% decline in an Oregon shrike population after a fire destroyed much of the sagebrush cover, as well as a decline in nest success. This pattern of altered fire regimes and exotic

grass invasion resulting from grazing is an increasing threat to desert scrub habitats in the Mojave and Colorado Deserts in the southern part of the state (Lovich 1998), and in oak savannah habitat.

Pesticides are considered by many to impact shrike populations, although this is based on mostly circumstantial evidence and exact impacts are not understood. Shrikes have a pure animal matter diet and are more vulnerable to pesticide ingestion than most passerines (Kridelbaugh 1981, Stevenson and Anderson 1994, *in* Pruitt 2000). While no effect on nesting success has been documented to date, direct effects on adult and juvenile shrikes have been detected (see Pruitt 2000 for review). Additionally, Blumton et al. (1990) noted a correlation between widespread loggerhead shrike declines and widespread use of organochlorine pesticides in the 1940s - 1970s. Such pesticide use has been largely banned since then, suggesting that if it did cause a decline, then other factors prevented recovery. While the effects of pesticides on shrike populations have been difficult to detect – on nest success, over-winter survival, or migration – evidence suggests they are a problem, and most shrike biologists strongly advocate further research (Pruitt 2000).

Predation on conspicuously perched adults is a suggested factor in declines; although such predation was responsible for high mortality rates in a wintering population in Virginia (Blumton 1989), it has been little studied elsewhere, and there are not satisfactory explanations as to why this would now be posing a problem for shrike populations. Mortalities caused by vehicle collisions may be threatening some already declining populations (Flickinger 1985), although this may be less of a problem in the west where more appropriate habitat is available and shrikes depend less on roadside habitats. In Virginia, collisions were second to predation as a cause of winter mortality (Blumton 1989); in Texas, shrike numbers were over-represented among roadside fatalities relative to their local abundance (Flickinger 1985).

Management and Research Recommendations

The biggest challenge to reversing declining trends of the loggerhead shrike is that the causes behind them are poorly understood. More research is needed to document and understand the threats to develop sound management prescriptions for this species. The following are a list of recommendations for researchers and land managers.

- Investigate the effects of an altered fire cycle and exotic invasion on shrike habitat and populations in desert scrub (as has been investigated in shrubsteppe; Humple and Holmes 2001).
- Continue efforts to curb shrubsteppe and desert scrub habitats conversion to exotics.
- Investigate effects of altered fire regimes and fuel management activities in pinyon-juniper.
- Study habitat fragmentation and its potential role in the decline in western loggerhead shrike populations (Yosef 1996, Pruitt 2000).
- Maintain and increase healthy riparian habitat, for both breeding and wintering habitat (see Riparian Bird Conservation Plan for recommendations for riparian management (RHJV 2000)).
- Initiate specific studies on the effects of pesticides (on breeding and wintering grounds) on nest success and both adult and juvenile survivorship.
- Initiate studies on productivity, post-fledgling survival, and annual survivorship in relation to land use and habitat. A quantitative assessment of population demographics in different habitats will identify factors limiting populations and may help focus management efforts on the most productive shrike habitat.
- Initiate studies to improve our knowledge of wintering ecology, winter distribution, and correlations between breeding and wintering populations. Low over-winter survival (Pruitt 2000) and quality of winter habitat may be affecting migrant populations (Yosef 1996).
- Initiate genetic research to determine if the threatened loggerhead shrikes in western Canada are wintering in California, both to improve management of their wintering grounds as well as to try

to determine if their population is being threatened by events on these wintering grounds.

Collaborate with researchers from Canada on this topic.

- Develop a reliable system for determining subspecies with morphometrics or genetics, as no method yet exists (Yosef 1996) for mainland populations.

Monitoring Needs

Greater coordination is needed amongst shrike biologists to make results more comparable (Yosef 1996). They were recently chosen as 1 of 15 “transboundary/migratory species of concern” species on a pilot Commission for Environmental Cooperation project, which will hopefully result in increased communication and cooperation among Mexico, the United States, and Canada, to focus conservation attention on this species (Pruitt 2000).

Although most studies outside of California indicate that nest success is not the problem (Pruitt 2000), this has not been well studied within the state. Productivity studies have begun in shrubsteppe in northeastern California (Humple et al. 2002) and are needed in the deserts of the southeast as well as the fast-developing coastal areas.

Breeding Bird Survey and Christmas Bird Count data both reveal negative trends that might be better understood if more intensive (and off-road) monitoring was established during both breeding and non-breeding seasons. Such monitoring should be implemented within areas where seasonal declines have been observed, and in areas where the population seems to be thriving; and such monitoring should be done in all appropriate habitat types, perhaps as part of multi-species bird community studies.

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